

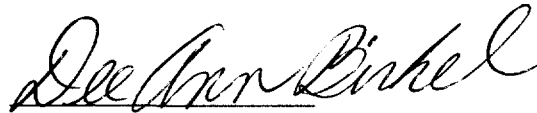
Yoga and the Athlete: A Building Block for Success

An Honors Thesis (HONRS 499)

by

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Abstract

“The practice of yoga creates an awareness of our physical body that will enhance those movements inherent in the sports we choose to do...It can provide a foundation for a healthy training program at any level.” These are the words of Dr. Douglas Hoffman, a family practitioner and athlete who practices yoga himself. His words and ideas are the basis for my Honors Thesis.

In this paper I plan to give a basic overview of some of the more popular types and philosophies of yoga. I also plan to relate how Hatha Yoga can positively effect the performance of an athlete. I will cite some case studies that support the use of yoga in combination with athletic conditioning, which enhances the mental concentration, ability and overall performance of the athlete and/or team.

Yoga is an ancient discipline that has been practiced for many years. Nobody quite knows the origins of yoga; however, it is thought to predate written history. Archaeologists have found seals with carvings of people in different yoga positions that date back well over 5,000 years. The practice of yoga has been transmitted generation to generation by word of mouth. The “teachers” would pass it on to their “students,” and this is the way yoga continues to be taught today.

The word Yoga comes from Sanskrit, the scriptural language of ancient India, and means “to yoke” or “to unite.” Yoga is thought to date back to the Indus Valley Civilization of 2000-4000 BCE. Yoga practices are designed to help make the individual feel whole, including the physical, mental, and spiritual dimensions (Lasater 6).

There are many aspects and practices of yoga in which a person may partake. One type of yoga is called “Gnyana Yoga” which is known as the intellectual path of yoga. There also are “Bhakti Yoga,” and “Karma Yoga.” These are types of yoga for developing the mind, which is based on the fact that the mind has three different aspects, which include knowing, feeling, and willing. In some people their intellectual mind dominates their brain, however, in others it is their emotions or actions. For intellectuals, the yoga of knowledge is the devotional yoga of love and faith; and for people of action, the yoga based on daily activity is best for them (Lehrer and Woolfolk 97). “Raja Yoga” is another type of yoga and it is often referred to as the “King of Yoga.” It is where all aspects and systems come together.

Gnyana Yoga or the intellectual path of yoga is the knowledge of oneself. “Gnyana” means “knowledge.” According to yoga philosophy, ignorance is the cause of pain and misery in one’s life, so not knowing who you are, will have consequences.

Intellectual exercises of yoga involve learning to decipher through the process of self-analysis, and continually asking the question “Who am I?” This is the problem the person with knowledge must solve. Figuring out oneself is not by the virtues one has, or the characteristic traits they hold, it means really discovering oneself. The first step of Gnyana Yoga involves asking, Am I my body? Until one can be sure of the answer, one cannot move on to the next stage. A person practicing Gnyana Yoga has to realize that a body can lose it’s sight, hearing, become paralyzed, or lose a limb, yet physical attributes are not all that a person is made of. The second step involves asking oneself, “Am I my mind? For example, a person can experience many different feelings throughout life such as fear, anger, guilt etc. Just because they have one particular feeling does not define their being. The depth of Gnyana Yoga is a complicated process and involves much self-exploration into ones own values, emotions, and sense of self-existence(Lehrer and Woolfolk 99).

Another type of yoga is Bhakti Yoga, or the devotional path. The essence of the devotional path is love and sacrifice. It is an emotion of the heart, the relationship between the devotee and the object of devotion. The devotional path involves concentration on the object of devotion with constancy and faith. “Concentration” means that one is required to enter the “core” of the object of devotion and love until one feels totally merged into it and feels one with it. One completely loses one’s sense of a separate identity (Lehrer and Woolfolk 100).

Karma Yoga or the path of cause and effect is another type of yoga. “Karma” is the spiritual counterpart of the physical law of cause and effect. Human beings are mixed up in a wheel of cause and effect by their past and present actions. The time span not only

covers this life, but also past and future lives as well. According to this philosophy, there is no injustice in the world. What each one of us is in this life, depends upon what we have been and how we acted in our previous lives, and what we will decide to do in the future (Lehrer and Woolfolk 101).

Raja Yoga is an integration of all systems of yoga. A leader in this yoga was Patanjali, who embodied his teaching in 185 aphorisms or lessons to fight against the afflictions of humankind over 2000 years ago (Lehrer and Woolfolk 103). There are eight steps involved;

- (1) “yama” or the five abstentions
- (2) “niyama” or the five observances
- (3) “asanas” or over 200 balanced exercised postures
- (4) “pranayama” or regulation of the breath or life force
- (5) “pratyahara” or withdrawal of the senses
- (6) “dharana” or concentration
- (7) “dhyana” or contemplation
- (8) “samadhi” or the meditative state

The five abstentions and five observances may be considered the Ten Commandments of Yoga and are very similar to the Ten Commandments in the Bible. The five abstentions are violence, lying, stealing, sensuality, and greed. The five observances are purification, contentment, self-discipline, studiousness, and surrender to God or the Higher Self. The objective of Raja Yoga is to observe, recognize, and control the activity of the nervous system. Using the last 3 steps of Raja, which are “dharana,” concentration on one object or idea, “dhyana” meditation, steady concentration on one

object or idea, and “samadhi,” a state of super consciousness, the individual self is united with the universal self. When you reach “samadhi,” the ultimate goal in yoga, it is in this state that the desired experience of peace and happiness is attained.

While there are many different practices and spiritual beliefs in yoga, a large part of it is not carried over to the Western, modern day practice. When you ask the average person what they think yoga is, often people think of calisthenics, or other acrobatic moves such as the head stand, the lotus pose, or other “pretzel poses” where the body is all contorted. Others think it is only meditation, chanting and humming, and others believe it is a “weird” religion. As previously stated, yoga encompasses many different aspects.

One type of yoga that is gaining a large following in our Western culture is “Hatha Yoga.” Hatha Yoga has become increasingly popular in the late 1990’s. It is now “trendy” and is shown in a variety of modern fitness magazines. It has been in our Western society for over 100 years, but dates back to the eleventh century AD, when Gorakshanatha, a great master, articulated its philosophy and discovered many of the Hatha Yoga practices (Bodian 15). The main concept of yoga is sometimes difficult for people to grasp because it focuses on self-knowledge. Often we are so caught up in discovering world knowledge, we forget to find ourselves. Hatha Yoga recognizes the eight steps of Patanjali’s path but focuses mainly on two of them, posture and breath control which are the third and fourth limb of the eightfold path. Hatha Yoga is a combination of the physical practice of yoga and Raja Yoga, which is the mental exercise. It involves the regulation of the mind and body through 14 different breathing exercises (pranayamas), of which the abdominal breathing is only the first exercise. Over

200 balanced physical postures (asanas) are used to exercise every muscle in the body, to prevent skeletal-muscular deterioration, keep the body supple, tone all the internal organs in the body, and insure their healthy functioning. Hatha Yoga seeks to awaken the body's psychospiritual energy (kundalini) which is thought to strengthen, heal, rejuvenate, and charge our physical frame. It also uses relaxation and cleansing techniques. Great masters of Hatha Yoga have been able to amazingly control their bodies. A few can stop their hearts and enter into a state of suspended animation, and regulate their brain waves at will. However, a select few will achieve this mastering of their mind and body. The power and potential of yoga is endless, and we as a Western society are only just recognizing some of its benefits in our daily lives.

Hatha Yoga focuses on one of two areas, one of which is Pranayama or breathing. Ayama means to curb or to master. In Pranayama, one is trying to master the length, expansion, retention and control of the breath. Prana is the sum of the total energy of the universe, the "life force." The concept of Prana is such a vast idea in the Eastern world it is hard to limit but here in the Western world we do limit this concept to breathing exercises. Breath control is not the aim, it is only the means of learning to control and distribute the vital energies (Lysebeth 37). The main parts of Prana absorption are 1) the nerve endings in the nasal cavities, 2) the air and cells in the lungs, 3) the tongue, and 4) the skin. The main function of our skin is to absorb and eliminate Prana. We must have adequate oxygen for our cells to function properly. Breathing is usually something we do not think about. It just happens naturally and is controlled by the autonomic nervous system. We often think about other life sustaining measures such as staying hydrated and drinking the suggested eight glasses of water a day. We also hear about eating properly

from the four basic food groups to support and nourish our bodies. Yet, not many think of how important or how much air we breathe. We breathe around 23,000 times a day, taking in around 13,000 liters of oxygen. That is about 4,500 gallons of air and 25 times that amount, if exercising. Upon examining the importance of breathing, we can look at words such as “inspired” and “expired.” When we hear great and wise people talk we get “inspired” by their words. The “yogi’s” believe the more “prana” or “life force” one has, the more vital energy and mental alertness one also has. However, when someone dies and the “life force” has left them, we say that the person has “expired.” Their energy has left them along with their last breath (Lehrer and Woolfolk 118).

Breath can influence both the body and the mind. Our physical, mental and emotional states are affected. It can enhance our psychological and spiritual well being. The way we breathe effects our state of mind and emotions. When someone jumps out and scares you, your body prepares for the “fight or flight” response. Your breathing and heart rate increase, your body becomes ready for action. When you are in the midst of a deep sleep, your breathing is slow and controlled, and the body is totally relaxed. The majority of the people are used to breathing very shallow and only from the upper portion of their lungs. One can tell if a person is doing this by the way their body moves. If a person’s shoulders are continually moving up and down, they are shallow breathing. However, we did not start out breathing this way. When we all were babies we breathed correctly because our breaths were diaphragmatic. Unfortunately, when we start growing up we are taught to lift our chests, pull in our stomachs, and hold our breath. This technique blocks the air from reaching the lower part of our lungs, and starves the lungs of life-supporting oxygen (Ahuja 25). Abdominal breathing, which is the proper way to

breathe, is controlled by the diaphragm. It is a very strong, dome-shaped muscle that separates the chest cavity from the abdomen. When a person takes a deep breath in, the diaphragm contracts and pushes downwards, causing the abdominal muscles to rise and relax. This allows the lungs to expand, and creates a partial vacuum in which the air is then inhaled. When the person exhales, the diaphragm then relaxes, the abdominal muscle's contract, and the air is expelled. This rhythmic motion gently massages and compresses the organs and improves the circulation in the body. However, gravity is a factor in breathing because the blood is not evenly distributed throughout the whole lung. More blood tends to pool in the lower part of the lung when the person is in the upright position. Yoga counteracts the effects of gravity in that the deep yoga breathing tries to reach right down to the lower part of the lungs. Yoga breathing is based completely on exhaling all the stale air from the body so that when one inhales, it brings about almost a complete change of air. In yoga it is more important to breathe out than it is to breathe in; therefore, the exhalation in yoga breathing always lasts twice as long as the inhalation.

In yoga, the nose is the important organ for breathing and the mouth is mainly for talking and eating. Hairs in each nostril provide as our body's natural filtration system, cleaning out much of the air's impurities. The nose is also able to adjust the temperature of the outside air we breathe so that it is not as harsh once it enters the lungs. The act of full diaphragmatic breathing gets rid of the body's carbon dioxide and activates the sympathetic or involuntary nervous system. In addition to this process, the diaphragm and intercostal muscles are strengthened with each full breath.

Yoga uses a variety of breathing techniques based on the same principal as a full diaphragmatic breathing. There are the full yoga breath, alternate nostril breathing and

step breathing to name a few. Unless one breathes properly while practicing the yoga poses and exercises, one will not get the favorable effects of yoga. While concentrating on your breathing may be hard at first, it soon becomes natural and automatic if practiced regularly.

One of the most difficult parts of yoga may be coinciding the breaths with the physical exertion. It is important because this is an area where yoga produces some of its greatest benefits. The breath directly effects both the external and internal movements and is a great way to influence the shape of the spine, an area said to be the single most important structure in Hatha Yoga. The physical movements of yoga work the body outward to inwards starting from the external muscles and moving inwards toward the internal organs. While the breath works inside to outside starting inwards from the internal organs and moving outwards, toning the supportive breathing muscles. Some general guidelines when practicing Hatha Yoga breathing and movement are:

- *Forward bending occurs most easily during exhalation.
- *Backward bending is generally executed during inhalation.
- *Twisting movements occur most readily during exhalation.
- *Movements that expand the chest and thorax are initiated during inhalation.
- *Movements that compress the abdomen area and thorax region are initiated during exhalation (Bodian 30).

As the body begins to get tired, the breath usually becomes rough and uneven, which indicates a need to rest or a change in posture. When one is no longer able to maintain evenness in their breathing, it is suggested that it is time to end the practice for the day. We can tell many things about our breath, just by listening to the sounds and

texture of the breath. If our breath is raspy, or horse, it is often an indication of colds or other illnesses. If we listen to many of our body's signs and warning symptoms, we can take steps to avoid the disease before it develops.

Yoga breathing can be an excellent outlet of the stress and anxiety of competition. Picture yourself standing at the center of the field, hearing your name announced, your heart is racing, your breathing is rapid and shallow, your palms are sweaty and you have a nervous stomach. The competition is about to begin and the state your body is in may not allow you to be as focused as you should be. This is where by practicing Hatha Yoga, you can control many of these anxious responses that are experienced prior to competition, and perform at the level you desire. Yoga can also eliminate injuries and be a great addition to the conditioning program of all sports.

Being a former collegiate athlete, I can see the numerous benefits Hatha Yoga might have had on my training program and overall athletic career. Hatha Yoga can benefit athletes in five major ways: It can teach an effective way to stretch and strengthen the body, it can promote physical balance and agility, increase mental alertness and concentration, help prevent injuries and discomforts, and enhance the oxygen uptake in athletes.

Top athletes differ from ordinary athletes. Most superior athletes have balanced postural alignment and muscle tone. It is then logical to conclude that if the average athlete improves in their posture and maximize their muscular balance; their athletic performance will improve as well.

The B.K.S. Iyengar method of yoga is based on this central principle of balance. Each individual muscle is capable of contracting, lengthening, and relaxing. Second, the

opposing or corresponding muscle groups such as hamstrings and quadriceps need to be equally strong and stretched. Third, the joints, when surrounded by a balanced muscle tissue, are free to move in their full range of motion. Fourth, the alignment of the body is what makes it possible to take a full breath. Finally, with the body having balanced postural alignment, it is possible for the energy to flow equally to all parts of the body (Couch 4). Iyengar believes that balanced movement is self-perpetuating; the more freely you move the more you can move.

Athletes generally know their bodies. Many athletes just need to learn new ways to train to bring about more satisfaction that comes from not only a physical balance but mental and spiritual balance as well.

All athletic teams stress the importance of stretching in order to prevent injuries. There is physiological support for stretching. The power of athletic movement is produced by the contraction and shortening of the muscles. If you over-stretch the muscle spindle or fiber, injury occurs. An athletic exertion is viewed as the repetitive and coordinated contraction of muscles and muscle groups. How often the continual contractions occur, determine the resting length of the muscle spindle in the muscle. When the spindle learns that the muscle is being asked to continually shorten to produce hard fast movement in the case of a powerful athletic motion, it adjusts to the demands placed on it and therefore, become increasingly resistant to stretching or lengthening. Muscles that are consistently worked without stretching can become hard and short. The feeling the athlete recognizes is tight and sore, therefore, restricting movement and hampering performance. A muscle should be held in a sustained stretch position so that the cortex of the brain can first receive and then send out new "instructions" to the

muscle spindle to lengthen. When an athlete is continually tight, the brain is always receiving the message that the muscle spindle needs to lengthen, and therefore it becomes less sensitive to other messages in the body. By lengthening the resting length of the muscles, the stretch reflex is not automatically sent as often to the brain, allowing the brain to receive and respond to more subtle stimuli (Couch 12).

Many athletic programs have seen the benefits of a strength program. Weight rooms have become very popular and crowded with athletes. An emphasis is placed on getting as big as you can, because this will produce the most strength, power and an overall better performance. A problem that many do not realize is, that while bulging muscles may say health and strength on the outside, often on the inside they tend to:

- ◆ Inhibit the movement of joints
- ◆ Prohibit full contraction of opposing muscles
- ◆ Misalign the body
- ◆ Cause general discomfort and inefficient movements
- ◆ Increase the possibility of injury and tears and
- ◆ Deter maximum pumping action within each muscle (Couch 10).

These are some problems that may occur if an athlete is only focusing on building and bulking up the muscle, while forgetting about the other components of a fitness program such as stretching and flexibility.

However, there is a difference between stretching and yoga. Stretching is often jerky or forced and aimed for certain degrees of flexibility, while yoga poses are slow and controlled, and work toward a physical, mental, and spiritual balance. Yoga gives the athlete a greater control over the positioning, safety and efficiency of each pose.

However, yoga can be performed incorrectly and injury is possible. Yoga is introspective which allows for the person to see how they feel or respond physically and emotionally after each pose (Couch 7). Many times athletes talk to teammates and use the stretching time to “catch up” on the day’s exciting events instead of focusing on the goals at hand. If athletes are talking and not fully concentrating, often they lack movement control and are not listening to what their bodies are telling them; this is introspective feedback. If one does not listen to their bodies, they will not know whether they are pushing themselves too hard through a pose or not enough. Yoga stretching requires concentration, introspective feedback, experiencing and feeling the muscles, and proprioceptive sensations, which is knowing where your body is and how it feels in that position.

There are three types of yoga exercises that should be implemented into an athletes’ training program: Yoga Supplemental Exercises (YSE), Yoga Compensation Exercises (YCE), and Yoga Regeneration Exercises (YRE). Yoga Supplemental Exercises is participating in activities other than your sport to build overall fitness. The purpose in doing so would be to develop a broader range of muscles. How often do you think you are in the best shape in your sport and then you play a different sport and are extremely sore the next day? “You think how can that be, I’m in great shape!” YSE target different muscles than the ones normally used to working. YSE works some opposing muscle groups that ordinarily would not get a chance to be used or stretched during the normal routine of the individual’s sport. If children begin competition and training for a particular sport at an early age, the constant use of the same muscles and tendons can negatively influence the muscular development of the child. By practicing

YSE, it develops a strong base, which one can build on and train for specific sports. If YSE are not practiced, overuse injuries can occur at an early age and inhibit further achievement and progress of the young athlete in the sport. Supplemental exercises are also very important as a mechanism for the physical and mental stress that accumulates. The intensity of the sport and the high pressure of it on the nervous system make YSE a good “change of pace.” Yoga Supplemental Exercises are a very effective means of restoring energy and physical and mental equilibrium (Kogler 34).

Yoga Compensation Exercises (YCE) are beneficial to the athlete as well as YSE. As a result of long-term sport training, muscle imbalances can develop in an athlete’s body. This “one-sided” loading can cause damage, disturbance and injury to the motor system. For instance, in baseball, many times the throwing arm is more muscular than the non-throwing arm. In tennis, one arm is going to be stronger than the other. Many times the dominant arm or leg in the sport will be the strongest and a muscle imbalance occurs. The other side of the body tries to overcompensate at times, often resulting in injury and discomfort. Yoga Compensation Exercises come in to play when yoga poses and counterposes, stretch and strengthen muscles not used in the sport.

Finally Yoga Regeneration Exercises (YRE) are important in successfully completing long and intensive training. Being able to achieve at a top performance level often depends on if the athlete can regenerate his/her physical and mental strength after training. Regeneration is a biological process prepared for athletes in order to regain strength and prevent injuries (Kogler 36). Some benefits of YRE are

- * Restoration of strength after loading a muscle
- * Fast elimination of the symptoms of fatigue especially in the muscles

* Prevention of injury to permanently loaded muscles groups

I will use field hockey, a sport in which I am most familiar, as a model for yoga supplemental training and yoga regeneration exercises. These suggestions are taken from Alex Kogler's book Yoga for Every Athlete. Field Hockey is a sport that does not have a complete effect on the development of the body. That is why yoga should be used for supplemental training. Since field hockey involves running with a forward bend posture which interferes with proper breathing and blood circulation, yoga breathing exercises as compensation exercise are recommended. Some poses specifically designed to effect the spine and strengthen the lower back, is essential in a sport that involves running and bending over a small stick. Asanas recommended are the Cobra, the Bow, the Triangle, the Twist, the Locust, the Pigeon Posture, and the Cat Stretch. Field hockey is also very similar to soccer in which it is played predominantly by using the lower half of the body, and has a large amount of running involved. Those who play this sport need to practice asanas, which strengthen the upper body and the shoulders. More suggested exercises for soccer players and field hockey players are: The Body Straight postures, the Crow, the Side Crow, the Cobra, the Locust, the Yoga Sit-up, the Modified Bow, the Twisting Position, the Twist, the Triangle, the Bow, and the Plough. Use one or two yoga asanas and the complete yoga breathing when starting your regular warm-up routine. These are good for both practicing concentration as well as for warming-up the muscles.

Another large component of field hockey is the running. There are both sprints and long distance training involved in the conditioning and training for the sport. Simple cyclical movements like walking or running are "one-sided." Therefore, complex yoga training such as supplemental exercises are recommended. During running, the organs of

the stomach are pulled down, which lowers the diaphragm, which, in turn, enhances inhalation. The position of the diaphragm is more favorable to inhalation than exhalation during running. More strength of the abdominal muscles is required for sufficient exhalation during running rather than resting. The suggested exercises for walking and running or sports that incorporate running are: Asanas with reverse position, and asanas that affect the spine for prevention of pain in the lower back. The Half Shoulderstand, the Shoulderstand, and the Headstand, are all reverse asanas that massage the organs that have been pushed down during running.

Asanas which stretch the muscles of the thigh, calf and ankle: are the Leg Stretch, the Head to Knee Posture, the Dancer's Posture, the Seated Forward Bend, the Modified Camel Posture, and the Lunge. There are specific asanas that are used for the warm-up which activate the muscles and prepare them for stimulation.

Specific Activating Asanas:

- | | |
|-------------------------|---------------------------------|
| •The Cobra | •The Twist |
| •The Locust | •The Scale |
| •The Bow | •The Abdominal Lift |
| •The Half Shoulderstand | •Salutation to the Sun |
| •The Modified Camel | •Kapalabhath Breathing Exercise |

When athletes have finished competing or have a pause or break in their performance, they will want to deactivate the body, which has a relaxing and calming effect. In general, deep, slow, long exhalations with closed eyes and leaning the trunk forward all have a calming effect.

Specific Deactivating Asanas:

- The Modified Standing Forward Bend
- The Seated Forward Bend
- The Plough
- The Fish
- The Relaxation Posture
- Complete Yoga Breath
- Alternate Nostril Breath

Some general guidelines suggested by Kogler for starting a Hatha yoga routine for the athlete's sport or activity:

- ♥Start with asanas that stretch and relax the limbs and strengthen the muscles, ligaments, and joints.
- ♥The routines should include asanas for exercising the spine (different bends: forward, backward, side, rotation executed in standing, sitting or lying positions.
- ♥The routine should further include at least one asana in a reverse position and an asana that compresses the stomach cavity (abdominal lift).
- ♥Yoga asanas are 80 percent mental and 20 percent physical. Practicing yoga asanas is like meditation.
- ♥Usually the routine starts with easier asanas.
- ♥When practicing asanas with a forward bend, it is necessary to compensate with backward bending asanas.
- ♥Work on appropriate breathing techniques to get the maximum benefits from the yoga asanas.
- ♥If there is movement to one side, movement should be practiced on the opposite side as well to achieve balance.
- ♥Try to start your regular sport training with short meditation as part of your regular warm-up. This meditation will be a transition to the concentration

required for your training or competition. It will help with a calm analysis of the situation or problem at hand or competition. It will enhance clear thinking and eliminate anxiety and stress.

Yoga can be very beneficial for athletes. Dr. Douglas Hoffman is the Director of Sports Medicine at Physician's Plus, A Sports Medicine Facility. He is an athlete who practices yoga and also firmly believes in its ability to reduce and relieve common overuse injuries that occur in athletics. Injuries such as shoulder pain, low back pain, knee pain, muscle pulls, and tendinitis, which are all due to either overuse or underlying imbalances within the body. Dr. Hoffman refers to our bodies as an entire chain. The body movement is the kinetic chain. One kink in an area of the chain is likely to affect its movement at another site in the chain, or the body. Therefore, an athlete that is affected by knee pain may not have an injury specifically in the knee but rather, could have weakness or inflexibility's in the hip region, which is reflecting the pain in the structure of the knee. Yoga has understood this concept for years. It works on the body as a whole, and brings awareness to all parts of the body, mind and breath. Yoga creates balance within the body. A balanced body has strength, suppleness and endurance (Hoffman). Yoga emphasizes strength of the "core" muscles, which are the back, abdominal, and buttocks. Yoga also focuses on suppleness, or flexibility. Many of the poses in Hatha Yoga require the ability to stabilize one area of the body while at the same time creating motion at a different site (Hoffman). Yoga creates awareness of where our physical body is moving and enhances the movements necessary in our own sports. Yoga can strengthen concentration, create clarity, ease the mind, and teach the relaxation skills necessary to perform the sport and the skills involved in the task at hand. "Yoga

can provide a foundation for a healthy training program at any level,” says Dr. Douglas Hoffman.

Not only Hoffman believes in the benefits of Hatha Yoga and athletes, Jerry Colletto is a coach who has found that Hatha Yoga has been beneficial to his football team’s athletic conditioning program. Often teams are pressed for practice time and try to rush through a variety of drills and stretches. Jerry’s approach is somewhat different. He says, “We never rush or throw ourselves aggressively into a yoga posture. Instead we move thoughtfully, each person at his or her own pace.” In his experience he indicated that yoga promoted flexibility of the spine and the muscles, quickness, agility, balance, mental concentration, coordination and strength. Cardiovascular endurance is also been shown to improve in the athlete’s functioning as well. Perhaps the greatest gain yoga has had to his team has been the way yoga has provided increased concentration. If a player has increased concentration, they will remember better what they have learned, and therefore, may be able to eliminate mistakes. Being able to focus one’s attention on a specific object or part of your own body, sets the tone for a practice session or a game day (Colletto 4). The deep abdominal breathing that is a component of Hatha Yoga is a key to the increased concentration. By being able to breathe deeply, and relax more into the stretch, the muscle will then flex a little more, possibly preventing strains later on during practice or a game. Jerry uses yoga breathing in his football teams’ huddle. Instead of the typical huddle where players are in a circle, and bent over the quarterback who calls the next play, his team stands upright, with their heads back, breathing deeply, relaxing, and concentrating on what the next play is and what must be done to execute it properly. This allows the oxygen to get to the lowest portion of the lungs’ lobes, adding

extra oxygen to the metabolism process. The extra oxygen is then able to go to the muscles, joints, and organs where it is available for more energy. Standing up straight in the huddle also helps maintain a confident, positive attitude through body language. Yoga is also helpful to Jerry's teams in that instead of standing around and talking to friends, the players in the drills, and in the game, concentrate on their breathing-techniques and assignments.

As Jerry Colletto was a student of yoga, a new dimension was added to his sports life. He found that with participating in Hatha Yoga, he could reach down into a hidden reserve he had in his body, which supplied "a little extra something" when he needed it. He could tap into this reserve and run a little faster, twist a little more, or stretch that much further. "The mind control that Hatha Yoga practice lends an athlete, allows him or her to fully experience the testing of limits that sports and life provide." Hatha Yoga can focus one's attention on the present and has the potential to calm the spirit and the body in a way that one can achieve their maximum effort.

Hatha Yoga is needed to calm the body especially because the physical stress an athlete puts on himself during an average mile run is enormous. The foot will strike the ground an average of 1,000 times during a mile. The force of impact on each foot is three to four times an individual's weight. That is a lot of stress on the body's bones, muscles, joints, and ligaments. If any part of a runner's form or stride is off, or out of balance, the body will try to compensate to avoid an injury. This compensation the body naturally goes through, puts additional stress on the muscles, joints, and the entire skeletal system. If you are off balance, the tight muscles get tighter, and the weak muscles continue to get weaker, perpetuating this vicious cycle. Yoga is crucial to a runner's performance and

overall health. Runners can use yoga to balance strength, increase their range of motion, and train the body and mind to the disciplined life of the runner. Yoga does not only affect the physical body of the runner, it teaches the individual to listen to their body and respond to the message their body is sending them. Running or any athletic activity produces a lot of endorphins in the brain. These chemicals are the body's natural painkillers, which can often mask pain and the onset of injury or illness in the body. Yoga involves listening to the body, and the general awareness one has of their body, its positioning, and the way it feels, making it easier to recognize the body's signals.

One of the things an athlete is most concerned about is conserving his/her energy. Nobody wants to expend more energy than needed. If the body is continually tight, it often results in pain along with a limited range of motion. This makes the body actually require more energy for all its activities. Being supple and relaxed allows you to burn energy at a more efficient level (Baptiste, Mendola). Running is a sport in which some of the highest Vo2 Max (aerobic capacity) have been recorded. Runners with a high Vo2 Max have the capacity to pump a lot of oxygen-rich blood to the working muscles. The maximum oxygen uptake is one of the biggest factors when determining running performance and endurance. With the correct asanas and pranayamas, one can maximize the amount of blood that pumps through the heart and reaches the vital muscles that sustain exercise.

In the Indian Journal of Medicine, a study was performed looking at the comparison effects of Hatha Yoga and physical exercise in athletes. The research was conducted at the Vemana Yoga Research Institute in Secunderabad. This study illustrates

that pranayama may be added to the regular workout of the athlete to improve performance.

Methods: The study had two groups, the control group who practiced physical workouts only, and the experimental group who practiced pranayama in addition to physical workouts. Exercise testing was performed at intervals of about every eight weeks. Pranayama was taught to the experimental group under the supervision of a yoga instructor. Sub-maximal and maximal exercise testing was carried out on the treadmill following Balke's protocol. Heart rate, blood pressure, respiratory frequency, minute ventilation, O₂ in expired air, CO₂ in expired air, blood lactate and blood pyruvate were the parameters measured. Venous blood was drawn from the antecubital vein immediately following treadmill exercise, to determine lactic acid and pyruvic acid in the subjects.

Results: The subjects in the control and experimental groups were similar to each other in regards to their age, height, and weight status. Before the pranayama training, all the parameters were comparable between the control and experimental groups at rest and after exercise. At the end of the study at rest, there was a significant reduction in minute ventilation in both the groups, and a significant reduction in blood lactate in the experimental group only. After exercise, the oxygen consumption at rest was significantly reduced in both the groups, however, there was a greater difference in the experimental group. The respiratory frequency was significantly reduced in the experimental group and increased in the control group.

Discussion: It was found that after pranayama and yoga training, the subjects were able to reach a significantly higher workload. There was a reduction in oxygen consumption,

which showed the body utilizing its oxygen more efficiently. The blood lactate levels were reduced significantly at rest and after exercise. It is concluded from the study that both the control and the experimental groups could perform more work, the oxygen consumption per unit work, and resting lactate were lower in the experimental group. This demonstrates a better oxygen delivery and utilization as a result of pranayama practice.

The conclusions in this study would suggest that it would be beneficial for athletic teams to participate in the supplemental conditioning program of Hatha yoga. It not only produces greater capacity of work effort, it prepares the body to use oxygen more efficiently, saving some of the athletes vital energy for extra performance. After the work out the athlete will experience a resting lactate that is lower, reducing some muscle soreness.

Another study in the Indian Journal of Physiology and Pharmacology at the Jawaharlal Institute of Postgraduate Medical Education and Research states that the practice of yoga improves both physical and mental performance. The study is the effect of yoga training on reaction time, respiratory endurance and muscle strength. The study was performed on healthy young volunteers, and specifically looked at the effect of yoga training on visual and auditory reaction times (RTs), maximum expiratory pressure (MEP), maximum inspiratory pressure (MIP), 40mmHg test, breath holding time after expiration and inspiration, and hand grip strength (HGS).

Methods: This study used 27 male medical student volunteers all 18-21 years of age, weight 50-69kg, and height 161-179 cm. The subjects all reported to the laboratory and were familiarized with the experimental procedures. For each test that would be

performed, practiced trials were administered. Control measurements were taken of all tests performed. The subjects were then given yoga training. Practice sessions of yoga were held for 30 min a day, 6 days a week for 12 weeks. All the same measurements were repeated after the yoga training.

Results: The results of the RT for both light and sound both decreased. The RT for light decreased from 270.0 ± 6.20 ms to 224.81 ± 5.76 ms, while the RT for sound also decreased from 194.18 ± 6.00 ms to 157.33 ± 4.85 ms. The decrease in both these values is statistically significant. Yoga training increased MEP, MIP, and breath holding time as well. Yoga training increased HGS from 13.78 ± 0.58 kg to 16.67 ± 0.49 kg. All the subjects reported that after yoga training they felt fresh, more alert and could concentrate on their studies better.

Discussion: A decrease in RT could indicate an improved sensory-motor performance and could be due to an enhanced processing ability of the central nervous system. The effect of yoga training on the central nervous mechanisms could be due to 1) greater arousal and faster rate of information processing and 2) improved concentration power and ability to ignore and/or inhibit extraneous stimuli (Madanmohan 232). The increase in both the MEP and MIP suggests that yoga training improved the strength of the expiratory and inspiratory muscles. Yoga postures involve isometric contractions, which are known to increase skeletal muscle strength, and supports the findings of increased HGS. The practice of yoga increases the performance quotient and makes a person psychologically more stable and mentally more competent (Madanmohan 233).

As I began this exploration in Hatha Yoga, I was intrigued by some of the information I had found. Being a former athlete, I am in full support of implementing yoga into today's athletic organizations. I was aware how Hatha Yoga helped suppleness, and flexibility to achieve an overall balanced body. Along with a balanced body, comes prevention from injury. The more in-tune mentally and physically an athlete is with their body, the less likelihood there is for injury. I was not aware of the benefits of yoga with regards to speeding up an athlete's reaction time, hand-grip strength, maximum inspiratory pressure, and maximum expiratory pressure. These figures were substantiated by the data. Now, if all coaches realized the potential yoga has on increasing an athlete's reaction time, and breathing muscle strength, many coaches would become interested in yoga for the athlete. Many times coaches are hesitant to use yoga in their conditioning program because of lack of time. What coaches may not realize however, is how yoga could save the athlete a lot of time that they may spend rehabilitating their injuries in the training room, or it may prevent them from getting injured in the first place.

A fresh runner/athlete is: alert and quick to avoid trouble; in possession of quick reflexes to respond to a possible sprain; sufficiently healthy to recover quickly from minor sprains and strains. On the other hand a tired runner/athlete is: sluggish and non-observant of possible trouble; dull and unable to react in time to avoid a sprain; run-down generally and unable to recover from minor problems that in turn may develop into serious injuries(Jackson 30).

The medical community has just begun to acknowledge the significance Hatha Yoga has had on our society. What "Yogi's" have known for thousands of years, is now

becoming medically validated. It can not be reiterated any better when Dr. Douglas Hoffman says that “The practice of yoga creates an awareness of our physical body that will enhance those movements inherent in the sports we choose to do.”

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Pictures

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